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Progress in Using an Electronic Playing Environment. A comparative study between cantors and primary teacher students specialising in music

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Abstract

This research was executed as self-study research in a music technology learning environment designed for teacher education. It explored the functionality of music technology teaching from the viewpoints of technical, physical, and social learning environments. Moreover, connecting music theory teaching to a notation programme was studied. The target group consisted of primary teacher students, and the control group were parish cantors. The participants kept a study log and answered questions related to the teaching and subject content. These data were analysed with qualitative analysis. Group differences were examined with Mann-Whitney's U-test. Both the beginners and experts had a defective command of the harmonisation theory.

Keywords: music technology; learning environment; teacher education; cantor-organist training

1. Introduction

The increasing use of computers and Information Communication Technology (ICT) in schools and homes has opened new horizons for music education and instrument pedagogy (see e.g. Juntunen et al., 2011). Many kinds of technological applications for music are available for the recording, saving, editing and sharing of audio, video and music scores. Free software and extensive background information to support teaching and learning music is available on the Internet. This situation presents challenges to

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music teachers and students: is there a need to modify the music education environment and if so, in which way? In addition to the traditional piano playing has come the form of the group studying.

Researchers have noted by Pike (2011) important physiological, educational and social benefits of group music study. There was a study, where constant-comparative analysis was employed and broad themes that emerged included: student satisfaction (N=35) through engagement with the technology; musical growth as a result of the technology and ensemble music; improved technical and musical skills; and increased confidence in both use of the technology and in its musical application.

Ringering (2012) states that teaching students to play in a small combo, to improvise and to play by chords is not only good preparation for their future music careers, it also makes them better performers in any musical genre. Playing with a rhythm section helps players internalize pulse. Analyzing pieces, creating song "skeletons," and improvising with these patterns gives students an "inside" experience in harmonic analysis and structure, and improvisation experience teaches students how to MSU (make stuff up) if they forget anything in performance.

1.1. Music Education Technology in the Teacher Education Environment

In the past twenty years, computers have entered music teaching, and this has facilitated many developments. Learning environments, institutional culture, and attitudes to learning and performance have been changed (Papageorgi et al., 2010). Technology is often a motivating factor in itself, and through it, unique creativity in an overwhelmingly "tonal" society is possible (Ward, 2009). The important question is what music skills do we want different learners to learn with the new technological applications? Technology is just an aid; teacher's pragmatic experience in teaching music technology is essential (see f.g. Daniel, 2004; 2006). According to Ojala (2006), music education as a discipline is at the intersection of music, education and technical science, and these disciplines can be considered as parent sciences to music education technology. This new term is used for educational technology especially as related to music teaching and learning.

Computer programmes originally designed for composing and producing music are nowadays an important part of computer-assisted music instruction. The spectrum of applications is remarkably extensive. According to Myllykoski (2006), the programmes can roughly be divided into notation programmes, sequencer software, accompaniment applications, ear training programmes, audio editors, and instrument learning software.

According to Ojala (2006, 16, 20-21) modern technology offers new versions of old tools and aims. The technology is important but it is useless without the appropriate ability to use it. This means that the know-how and practical skills in the use of technology is the main core, while the technology mainly is the knowledge about it. Ojala further emphasises that music education technology does not mean replacing living music playing, music teaching and students with machinery, but it means developing, researching, and advancing new methods inside music teaching and learning – first of all growing in the use of modern technology. Once this serves approved, positive aims, it will become a part of culture.

Music technology may be approached from different points of view. It may be a pedagogical, educational point of view observing the effects on learning or it may be one concentrating on the technological basis trying to develop pedagogically useful, practical and efficient solutions in teaching and learning music. Music technology can also be considered in light of its adequacy in the current curriculum and the working culture at school. We can consider how the new ways of communication have changed and are invariably changing the whole music scene and its enculturation processes. (Salavuo & Ojala, 2006; Ruismäki & Juvonen, 2009.)

The keyboard studio as a learning environment affords numerous possibilities for teaching various musical themes (see also Oksanen, 2003; Daniel, 2004; 2006). It functions as a learning environment for

both independent and teacher-instructed learning. Ear training and music theory are focal points of the curriculum of the keyboard studio. In addition, teaching free accompaniment, including accompaniment styles, improvisation, knowledge of chord signs, transposition, and harmonisation with chord rotation, are also featured in the curriculum. One can examine various scores in teaching and become acquainted with transposing instruments and instrument instruction.

2. Study design

2.1. Learning environments

The learning environment of this research was a MacIntosh–based keyboard studio, built for the primary teacher education programme in late 2009. There are playing stations for one teacher and six students, as well as a data projector. Every playing station comprises a Yamaha Clavinova, an iMac, a Roland sound module, and a Phonic mixer. The students have headphones for individual work, and the teacher is able to listen to the students, separately or together, through his or her own mixer.

Fig. 1. The learning environment of students

The student can also bring his or her own compositions or arrangements to share with others. These can be utilised as themes in practices, or then the student can distribute his/her own compositions to other participants through the Optima learning platform on the Internet.

2.2. Research problems

The aim of this research was to explore how two different groups, primary teacher students and cantor-organists, experienced their learning during the music technology course. The teacher's teaching methods, teaching content, the learning environment in the keyboard studio, and the social atmosphere of the course were examined in addition to students' own learning. This research task was further defined in the following research questions:

- How did the students experience the contents of teaching and the teaching methods?
- How did the students experience their own learning during the course?
- How did the students experience the functionality of the technical, physical, and social learning environment?

2.3. Method

This research was carried out with the self-study method, which is usually connected to action research, participatory research, and traditional research in which the teacher is the chief researcher (Herr & Anderson, 2005). This study belongs to the latter category. Music technology education and students' learning were studied in a learning environment, in which a keyboard studio and the notation programme *Sibelius* were used as tools. The course teacher functioned as a researcher (Tauriainen, 2010).

The aim of the researched course was to study various parts of the notation programme *Sibelius* (version 5.2) and utilise it as a teaching tool for composing and arranging music and learning notation. As a final assignment, the students made a miniature score from the gospel song, "Swing Low, Sweet Chariot". The objective was for the students to learn to quickly arrange and notate a melody they heard. Teaching included studying a real-time (i.e., flexi-time) playing technique in notation, harmonisation practices and arrangements. Harmonisation practices followed chord rotation (Major-minor-tonality; e.g., Finnish folk songs) and diminished chords, as well as a I-VI-II-V^7 rotation.

Teaching harmonisation in a simple and logical way is a challenge for the teacher. Combining cognitive and experiential learning helps meet this challenge (Tauriainen, 1994). Concrete work in a keyboard studio environment makes learning experiential. It also enables different forms of instruction including teacher-instructed and independent and pair learning, as well as differentiating, all of which were used in the two teaching groups.

The research was conducted with the following parameters. The target group of the study consisted of fifteen Jyväskylä University primary teacher students specialising in music, and the control group was formed of five Jyväskylä parish cantors. The learning experiences of these two groups, teacher students just beginning their music studies, and experts, professional musicians, cantors; were compared in this study. The comparison of the information from these two groups provided information on which issues in playing, theory and music technology are challenging to beginners. Secondly, a comparison of the experts and the novices was also conducted to discover how previous studies of music theory and instruments support the music technology studies.

2.4. Study material and analyses

The 16-hour-course for primary teacher students took place in spring 2009, and the 8-hour-course for cantors in autumn 2009. The research data was gathered continuously throughout the course. Learning diaries and questionnaires were used as data gathering methods. The data were given to the researcher using pseudonyms. The participants kept a study log and answered four open-ended questions after every lesson on the notation programme *Sibelius,* chord rotation, and accompaniment and arrangement solutions; they also had an opportunity to report about their other notions concerning the teaching and the learning environment. These texts were analysed with qualitative content analysis.

At the end of the course, the participants completed a questionnaire with 32 statements on a five-step assessment scale. The students' analysed teaching content and methods, their own learning process, and the functionality of the learning environment from physical, technical, and social viewpoints. Parts of the statements were formed into sum variants, whose internal coherence was examined with the *Cronbach alpha coefficient*. The *Mann-Whitney U-test* was used to analyse the differences between the groups, since it is well suited for analysing limited data (Elliott & Woodward, 2007).

3. Results

In the following section, we will explore the results of both quantitative and qualitative data for each research question.

3.1. How did the students experience the contents of teaching and the teaching methods?

Based on quantitative data, the functionality of the teaching content was assessed similarly in both groups. In the study logs, the students gave both positive and negative feedback. Both groups benefited especially from studying chord rotation and harmonisation. Thus, the primary teacher students learned music theory in practice, but the cantors also had something new to learn here, since in their work they had mostly trusted their hearing instead of their theoretical knowledge. The theory of harmonisation proved too difficult for some of the teacher students to understand, and few members of either group succeeded in the creative and complex application of the basics of harmonisation.

Because some of the teacher students experienced the course content to be too demanding in relation to their starting level, feelings of inferiority surfaced during the course. Some teacher students expressed a desire for a slower process, concentration on just a few songs, and more repetition. On the other hand, the advanced students were willing to face more challenges and wanted to choose their own songs. The cantors, however, saw that not even the teacher had full command of the *Sibelius* programme, but in playing and arranging, he had new information to offer. Both groups gave the teacher positive feedback on arrangement instructions and his natural pedagogical approach to using the *Sibelius* programme.

3.2. How did the students experience their own learning during the course?

Students assessed their own learning in relation to their technical and general command of the programme, learning the theoretical contents such as chord rotation, and motivation in using the programme. The cantors' learning in the technical command of the programme was better than that of the teacher students (Mann-Whitney $U=11.5$, $p=0.019$). Because the cantors had good skills in playing instruments, they quickly learnt to apply the real-time method of playing in notation. Even though the cantors on the average had a stronger background in the theory of music and more practice, it did not give

them a noticeable advantage in learning and commanding harmonisation theory. A comparison between the two groups did not produce statistically significant differences in this sense.

According to the learning diaries, the teacher students were better motivated to learn and use the programme than the cantors. The most advanced commented that working was easy and effortless, and with the basic knowledge of the *Sibelius* programme, they could use notation programmes in future. All participants understood the versatility of *Sibelius*, but they considered cantors to have a more realistic chance to obtain this programme and use it in future than the teacher students. The students thought they might use cheaper but simpler programmes in the future.

3.3. How did the students experience the functionality of the technical, physical, and social learning environment?

Both groups considered that the technical, physical, and social learning environments functioned well. There was no statistically significant difference in the quantitative assessments of the cantors and students. However, the analysis of the learning diaries revealed differences between the groups. The teacher students were able to utilise the keyboard studio of the establishment when practising, whereas the cantors did not have access to these programmes either at home or at work.

All students felt that they had received positive feedback from the teacher, but the teacher students criticised the instructor for paying more attention to teaching the more advanced students. In general, the atmosphere of the course was thought to be encouraging and positive for learning. The technological environment made it possible to observe peers' progress, ways of playing, and becoming acquainted with the products, which in turn motivated learning and supported the self-assessment of individual learning and action.

4. Conclusion

The results show that especially in the teacher student group, there were learners at many different skill levels, and many of the novices wanted a slower pace of studying and less teaching content. A clearer differentiation of teaching and content according to the level of students thus becomes a central challenge for future. The designed learning environment enables students' separate progress and individual instruction, while the other group members independently complete learning tasks. A more skilled student can also help a fellow-student in need of assistance. In future, teachers must compose more teaching material suitable for different students and utilise the differentiation possibilities offered by technology in a more conscious manner. The basic materials have to be reduced from the current number and the teacher must focus on the essentials, whereas additional materials can be provided for the more advanced students who seek learning challenges.

Contrary to presuppositions, many basic matters in free accompaniment such as chord rotations were as challenging to the experienced cantors as to the primary teacher students just beginning their specialisation in music. Neither did the teacher students' earlier studies in music theory, mostly done in connection with their leisure interests, much support free accompaniment. Traditionally, teaching in music academies is based on playing from the notes, and pupils are not introduced to chord signs or creating one's own harmonisations to a melody. This study showed that sound skills in playing an instrument do support notation based on real-time playing utilising music technology.

The designed learning environment supported combining theory teaching with notation and learning to play. Even difficult matters of harmonisation can be learnt when they are taught in an illustrative way providing application models and several opportunities to practice. Individual playing examples of familiar melody harmonisations are enlightening. However, even getting set in the playing station and

opening the *Sibelius* programme can create a surprising tension for the first-timers, and removing these tensions is the teacher's job. Creating a positive atmosphere and providing experiences of success are essential. Teaching a few basic commands for introducing notes to score and for listening to the product are good ways to let the students experience their own "composition" for the first time. An approach combining theory and practice in the right proportion is the best operational model in teaching. Overall, the participants were motivated to use music technology, but wished to have more opportunities to practise with the programme. There should be more technological playing stations for practising. The course could also be implemented over a longer period of time, which would enable the students to practise independently and solidify their skills with the programme before facing new learning challenges.

According to the starting point query, three of the 17 Jyväskylä parish cantors used some notation programme to help them in their work, mostly freeware or the programme *Encore*. Only one cantor actively used the *Sibelius* programme. Having command of a notation programme allows a cantor to explore new directions in his or her work. The programme can be applied to the needs of liturgies and choral activities, but also to composition and arrangement workshops that would provide a new and inspiring way to work among the youth.

The primary teacher students regarded the course as a good foundation for the future use of notation programmes as a tool in school music lessons. It is likely that technological playing stations will become more common even in primary school music classrooms, and the teachers will have new opportunities to use this technology to support the learning environment. By transcribing, carrying out and formatting his or her own ideas for composition with the help of music technology, a primary teacher can augment professional skills and become motivated in teaching music to pupils at different levels of musical skill.

With the help of self-study action research, issues that have been overlooked become evident in everyday teaching situations. Through systematic observation, learning challenges of different students can be identified and the requirements can be lowered or the pace slowed, if necessary. Thus, the teacher can also become more aware of his/her own challenges in teaching. This study showed the teacher that concretising lessons for less skilled students requires new teaching methods. More theory of harmonisation applied to practice seems to be needed by all students.

As Ajero said (2009), we are fortunate to live in an era of technological achievements, and there are a host of remarkable tools available to us as instructors. Taking advantage of these tools can help us teach more efficiently and spend more time on important musical concepts. These tools are also engaging and fun for students, enhancing the experience for all involved!

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